REMARKS

Claims 1-6 were pending in this application. Claims 1-6 stand rejected. Claims 1 and 4-6 were amended. Claims 7-11 were added. Claims 1-11 remain in the application.

Claims 5-6 were amended to provide uniform nomenclature in relation to "original spectral space".

Claims 1-3 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,729,631 to Wober in view of U.S. Patent 5,881,182 to Fiete. The rejection stated:

> 'With regard to claim 1, Wober discloses a method of removing noise from multi-band digital images in an original spectral space, said method comprising the steps of
>
> '(a) selecting a plurality of bands of a multi-band image to perform noise removal operation upon (column 2, lines 32-35). Wober discloses removing noise from an image by performing noise modeling at "various frequency levels." Modeling noice at various frequency levels is equivalent to selecting a plurality of bands.
>
> '(b) transforming each of the bands of the multi-band image to a spectral space advantageous for noise removal for multi-band imagery (column 2, lines 37-41). Wober discloses representing the signal as a pyramid consisting of different levels corresponding to different frequency bands. Representing the signal according to different frequencies is equivalent to transforming bands to an advantageous spectral space for streak removal.
>
> '(c) performing a noise removal operation on each band in the advantageous spectral space using information from the other spectral bands (column 13, lines 46-49). Here Wober discloses noise modeling and subsequent filtering. The noise is also filtered at all frequencies of each band. The filtering for each band depends on the other spectral bands of range of frequencies because of the way the DCT coefficients are determined. Each coefficient corresponds to a certain frequency range and is calculated using other coefficients for other frequency bands. This method is referred to as "down-sampling" (refer to column 11, lines 12-41). Wober does not disclose removing streaks, which are a form of noise.

'(d) transforming the noise removed bands from the advantageous spectral space back to the original display space (see abstract). Here Wober discloses "the image is restored with reduced noise." So after the noise is reduced, the image is restored in the original spectral space.

'Wober does not disclose applying the noise removal to removing streaks. However streaks are a well known form of noise. For example Fiete discloses removing streaks, as a type of noise, from images. Fiete states that "streaks not only reduce the aesthetic quality of digital images but can impact the interpretability of features in the images. Streaking also severely degrades the performance of pattern recognition and feature extraction software" (column 1, lines 60-64). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to apply Wober's method, to remove unwanted streaks as taught by Fiete in order to increase the aesthetic quality of the image as well as provide better interpretability of the image for use with pattern recognition and feature extraction software.'

Claim 1 has been amended to state:

1. A method of removing streaks from multi-band digital images in an original spectral space, said method comprising the steps of:

a) selecting a plurality of bands of a multi-band image to perform the streak removal operation upon;

b) transforming each of the bands of the multi-band image from an original spectral space of the electromagnetic spectrum to a spectral space of the electromagnetic spectrum advantageous for streak removal for multi-band imagery; and

c) performing a streak removal operation on each band in the advantageous spectral space using information from the other spectral bands.

The clause removed from Claim 1 has been rewritten as added Claim 7, which depends from Claim 1. The change from "spectral space" to spectral space of the electromagnetic spectrum" does not change the meaning of the Claim 1. The term "spectral" is used in the application, in reference to the electromagnetic spectrum.

The term "bands" and "multi-band" likewise refer to a part or parts of the electromagnetic spectrum. This is indicated explicitly throughout the application:

> 'The invention relates generally to the field of image processing, and in particular to an image processing method for removing streaks in multi-band digital images (images consisting of three or more spectral bands).' (page 1, lines 6-8)
>
> 'Multi-band imaging sensors typically are designed such that each band of the imaging system is sensitive to a pass-band of electromagnetic radiation. For example, a standard color imaging system consists of three bands (or arrays of detectors) sensitive to red, green, and blue light, respectively. Imaging systems such as multi-spectral or hyper-spectral systems contain many detector bands. These systems may contain spectral bands sensitive to non-visible parts of the electromagnetic spectrum such as to NIR (near-infrared), SWIR (short-wave infrared) or MWIR (mid-wave infrared) in addition to bands sensitive to red, green, and blue light.' (page 1, lines 15-23)

(See also: page 1, line 27 to page 2, line 7; page 2, lines 12-15; page 2, lines 23-25; page 3, lines 15-17; page 8, lines 18-25)

The rejection relies upon Wober to teach noise reduction by the processing of bands of a multi-band image. In Wober, the bands are discrete cosine transform (DCT) frequency bands rather than electromagnetic spectral frequency bands. Wober says:

> 'Note that here "frequency" means "DCT frequency".' (Wober, col. 14, line 35)

Amended Claim 1 requires bands of the electromagnetic spectrum. Claim 1 states:

> "transforming each of the bands of the multi-band image from an original spectral space of the electromagnetic spectrum to a spectral space of the electromagnetic spectrum advantageous for streak removal for multi-band imagery"

Claim 1 also requires:

> "performing a streak removal operation on each band in the advantageous spectral space using information from the other spectral bands."

Wober does not teach or suggest such use of information from other spectral bands of the electromagnetic spectrum. Wober states:

> 'The above noise modeling procedure should most advantageously be applied to each luminance and chrominance channel. For a typical image signal source having one luminance and two chrominance channels, this amounts to the requirement of generating 9 lookup tables and 9 noise masks for a three level pyramid structure.' (Wober, col. 12, lines 9-14)
>
> 'The input to the video memory 702 is the CCD camera 700 with associated lenses, shutter control, analog to digital converter, RGB to YUV converter, and timing circuits (not shown).' (Wober, col. 12, lines 33-36; emphasis added)
>
> 'Each YUV component is processed into three levels in DCT space as described in the following section entitled "Pyramid Image Representation".' (Wober, col. 12, lines 42-44; emphasis added)
>
> 'Once the DCT coefficient at each level of the pyramid image representation are filtered with a Wiener variant filter as described above, the filtered image is ready to be restored according to the steps shown in the block diagram of FIG. 8C.' (Wober, col. 15, lines 16-20)
>
> 'The first level IDCT coefficients represent the restored image, i.e. the noise reduced image, for the processed luminance or chrominance channel. <u>The above procedure is repeated until noise reduction has been effectuated for each channel</u> of the image signal source.' (Wober, col. 15, lines 33-37; <u>emphasis added</u>)

(See also Wober, col. 12, lines 9-14 in relation to noise modeling each of the luminance and chrominance channels separately.)

The noise reduction of Wober is unlike the claimed invention, but is like algorithms discussed in the Background of the application:

> 'Previously developed algorithms designed to remove streaks from digital imagery while preserving the sharpness and contrast of the image were designed to remove streaks on single band imagery; not on multi-band imagery. These algorithms only take into account spatial information present in the image to remove streaks. No attempt is made to examine additional color information or spectral correlation available in multi-

spectral or hyper-spectral imagery to remove streaks. As a result, when applying these techniques to multi-band imagery, these algorithms do not completely remove all of the color streaks present in the original image and may introduce objectionable color streaks or bands as artifacts. These algorithms do not preserve and/or restore the overall color fidelity of the image. In addition, applying algorithms designed to remove streaks from single band imagery on color or multi-spectral imagery, is a non-optimal method for streak removal for color imagery or multi-spectral imagery, as these algorithms do not use all of the available information that is present in multi-band imagery during the streak removal process.' (page 3, line 25 to page 4, line 10)

Wober does not teach removal of streaks. Fiete teaches removal of streaks in the spatial domain. (See Fiete, columns 4-7) Why would one of skill in the art combine Wober and Fiete to remove streaks, rather than simply relying upon Fiete? In relation to Claim 4, the rejection stated:

> "it would have been obvious to one of ordinary skill in the art at the time of invention to perform the streak removal method of the patent after transforming bands of a multi-band signal to a spectral space advantageous for streak removal or noise removal, because the noise or streaks could be made signal independent in the frequency domain and thus easier to remove."

Where is there a teaching or suggestion that Wober (which does not address streaks) would provide an easier streak removal method than Fiete? The above comment ".. because the noise or streaks could be made signal independent in the frequency domain and thus easier to remove" is from the discussion of prior art in the Background of the Invention of Wober. Wober was filed before Fiete. It is speculation to impute a comment on the prior art as of Wober, to Fiete, a later filed patent.

In addition, Fiete applies streak removal to each electromagnetic band independently. (application, page 4, line 26 to page 5, line 4) Wober applies noise removal to each of the chrominance and luminance channels separately. (see discussion above) A combination of Wober with Fiete still does not teach or suggest streak removal operation on each electromagnetic spectral band using information from the other electromagnetic spectral bands.

Claims 2-3 and 7 are allowable as depending from Claim 1 and as follows.

In relation to Claim 2, the rejection stated:

> 'With regard to claim 2, Wober discloses a method wherein the spectral space advantageous for noise removal for multi-band imagery is dependent on at least one of the number of bands of data, and the spectral band pass of each of the imaging bands (column 2, lines 37-41). Here Wober describes the advantageous spectral space as a pyramid representation of the image signal in which each level of the pyramid corresponds to a different frequency level or band of image signal data. Wober further discloses a method wherein the spectral space advantageous for noise removal for multi-band imagery is dependent on imaging band dependent characteristics of the one or more sensors used to capture the bands (column 3, lines 48-52). Here the sensors used to capture bands are included in the hardware of a noise removal system which includes a discrete cosine transform processor and a Wiener filter combined for removing all frequencies of noise from an image. The discrete cosine transform processor is used to capture the bands and is dependent on frequencies of image signal. In the Wober-Fiete combination, the technique would be applied to streak removal as discussed with respect to claim 1.'

Claim 2 states:

> 2. The method as claimed in claim 1 wherein the spectral space advantageous for streak removal for multi-band imagery is dependent on at least one of the number of the bands of data, the spectral bandpass of each of the imaging bands, and imaging band dependent characteristics of the one or more sensors used to capture the bands.

As in Claim 1, the term "spectral" again refers to the electromagnetic spectrum. In Claim 2, the electromagnetic spectral space advantageous for streak removal is dependent upon at least one of the bands of data, electromagnetic spectral bandpass of the bands, and electromagnetic imaging band dependent characteristics of the one or more sensor used to capture the electromagnetic spectrum bands. The rejection, in contrast, relies upon Wober's DCT (frequency)

domain pyramids. The rejection also relies upon a definition of "sensors" that does not match ordinary usage (see, for example, page 1 of the application) or sensor 10 described in the application. (See Figure 1, page 7, lines 24-26)

in relation to Claim 3, the rejection stated:

> 'With regard to claim 3, Wober discloses the transformation performed in step b) consists of a linear combination of the original bands (column 2, lines 37-44). Wober discloses a pyramid representation of the signal where different levels of the pyramid correspond to different frequency bands. The signal is transformed with discrete cosine transform coefficients for each frequency band. This is a linear combination of the original bands. In the Wober-Fiete combination, the technique of linear combination of bands would be applied to the method for streak removal as discussed with respect to claim 1.'

Claim 3 states:

> 3. The method as claimed in claim 1 wherein the transformation performed in step b) is a linear combination of the original bands.

As in the other claims, the bands are of the electromagnetic spectrum. Wober, as discussed above, does not teach or suggest combining bands of the electromagnetic spectrum. The channels, in Wober, are kept separate.

Claims 4-6 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S.Patent 5,881,182 to Fiete in view of Patent 5,729,631 to Wober. In relation to Claim 4, the rejection stated:

> 'With regard to claim 4, Fiete discloses a method of removing columnar streaks from a multi-band digital image of the type in which it is assumed that pixels in a predetermined spatial and spectral region near a given pixel are strongly related to each other and employing gain and offset values to compute streak removal information comprising: testing for a strong relation between the pixels in a predetermined spatial and spectral region near a given pixel and computing streak removal information only if such a strong relationship exists, whereby image content that does not extend the full length of the image in the column direction will not be interpreted as a streak (See Abstract).

'Fiete does not disclose the improvement comprising: transforming the pixels of the multi-band image to a spectral space advantageous for streak removal, wherein the transformation is a linear combination of at least two of the original bands. Wober discloses this improvement (column 2, lines 37-44). Wober discloses a pyramid representation of the signal where different levels of the pyramid correspond to different frequency bands. The signal is transformed with discrete cosine transform coefficients for each frequency band. This is a linear combination of the original bands.

'Wober discloses and image noise reduction system that applies "noise masks" at different levels of a pyramid image representation. Wober discloses reducing noise in an original spectral space. Each level of the pyramid described by Wober corresponds to a transformation of the signal using a different frequency band (column 2, lines 34-42). The signal represented at different frequency bands allows for the noise removal in an original spectral space.

'Wober teaches "Signal dependent noise which is much more difficult to reduce than additive noise, can be reduced by first transforming the noisy signal into a domain where the noise becomes signal independent, then removing the signal independent noise using a conventional method such as Wiener filtering." Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to perform the streak removal method of the patent after transforming bands of a multi-band signal to a spectral space advantageous for streak removal or noise removal, because the noise or streaks could be made signal independent in the frequency domain and thus easier to remove.'

Claim 4 states:

4. In a method of removing columnar streaks from a multi-band digital image of the type in which it is assumed that pixels in a predetermined region near a given pixel spatially and spectrally relative to the electromagnetic spectrum, are strongly related to each other, and employing gain and offset values to compute streak removal information, the improvement comprising: transforming the pixels of the multi-band image to a spectral space of the electromagnetic spectrum advantageous

for streak removal, wherein the transformation is a linear combination of at least two of the original bands, and testing for a strong relation between the pixels in the predetermined region and computing streak removal information only if such a strong relationship exists, whereby image content that does not extend the full length of the image in the column direction will not be interpreted as a streak.

Claim 4 is supported by the application, as filed, in the same manner as Claim 1.

Claim 4 is allowable on grounds discussed above in relation to Claim 1. Claim 4 requires:

"transforming the pixels of the multi-band image to a spectral space of the electromagnetic spectrum advantageous for streak removal".

The bands are of the electromagnetic spectrum. Claim 4, thus, requires that the transformation is a linear combination of at least two of the original electromagnetic bands. The cited references teach or suggest no such combination.

As to Claim 5, the rejection stated:

With regard to claim 5, Fiete discloses a method of removing streaks in a digital image, said method comprising steps b) through h).

b) detecting pixel locations in the image where pixel-to-pixel differences caused by streaking can be distinquished from normal variations in the scene data (column 2, lines 48-51);

c) performing a linear regression to determine an initial estimate of the gain and offset values between each pair of adjacent pixels in a direction perpendicular to the streaking using the pixel values at the detected locations (column 2, lines 51-53);

d) performing a statistical outlier analysis to remove the pixel values that are not from streaking (column 2, lines 53-54);

e) performing a linear regression to determine the gain and offset values between each pair of adjacent pixels in a direction perpendicular to the streaking using the pixel values at the detected locations that are not statistical outliers (column 2, lines 55-60);

f) setting the slope value to unity if it is not statistically different from unity (column 3, lines 55-60);

g) setting the offset value to zero if it is not statistically different from zero (column 2, line 55-60;

h) using the slope and offset values to remove streaking from the corresponding line of image data (column 2, lines 55-60);

Fiete does not disclose steps a) and i).

Wober discloses step a) transforming a multi-band image to a spectral space advantageous for noise removal for multi-band imagery, thereby forming a transformed image (column 2, lines 34-42). Wober discloses reducing noise in an original spectral space. Each level of the pyramid described by Wober corresponds to a transformation of the signal using a different frequency band. The signal represented at different frequency bands allows for the noise removal in an original spectral space.

Wober also discloses step i) transforming the streak removed transformed image from the advantageous spectral space back to the original display space (see abstract). Here Wober discloses "the image is restored with reduced noise."

Wober teaches "Signal dependent noise which is much more difficult to reduce than additive noise, can be reduced by first transforming the noisy signal into a domain where the noise becomes signal independent, then removing the signal independent noise using a conventional method such as Wiener filtering." Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to perform the streak removal method of the Fiete after transforming bands of a multi-band signal to a spectral space advantageous for streak removal or noise removal, because the noise or streaks could be made signal independent in the frequency domain and thus easier to remove. Then of course the noised reduced image could be transferred back to the original display space.

Claim 5 has been amended to state:

5. A method of removing streaking in a multi-band digital image in an original spectral space of the electromagnetic spectrum, said method comprising the steps of:

a) transforming the multi-band image to a spectral space of the electromagnetic spectrum advantageous for streak removal for multi-band imagery, thereby forming a transformed image;

b) detecting pixel locations in the transformed image where pixel-to-pixel differences caused by streaking can be distinguished from normal variations in the scene data;

c) performing a linear regression to determine an initial estimate of the gain and offset values between each pair of adjacent pixels in a direction perpendicular to the streaking using the pixel values at the detected locations;

d) performing a statistical outlier analysis to remove the pixel values that are not from streaking;

e) performing a linear regression to determine the gain and offset values between each pair of adjacent pixels in a direction perpendicular to the streaking using the pixel values at the detected locations that are not statistical outliers;

f) setting the slope value to unity if it is not statistically different from unity;

g) setting the offset value to zero if it is not statistically different from zero;

h) using the slope and offset values to remove streaking from the corresponding line of image data; and

i) transforming the streak removed transformed image from the advantageous spectral space back to the original spectral space.

Claim 5 is supported and allowable on substantially the same grounds as Claim 1. The rejection again cites the discussion of prior art in the Background of the Invention of Wober as making it obvious to combine Wober and Fiete:

> 'Wober teaches "Signal dependent noise which is much more difficult to reduce than additive noise, can be reduced by first transforming the noisy signal into a domain where the noise becomes signal independent, then removing the signal independent noise using a conventional method such as Wiener filtering."'

As discussed above, the later patent--Fiete goes against this teaching and removes streaks in the spatial domain. Having Fiete, what would motivate one of skill in the art to instead rely upon a teaching about the prior art at the time of Wober?

This rejection also apparently assumes that Fiete is performed in the frequency domain:

> "Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to perform the streak removal method of the Fiete after transforming bands of a multi-band signal to a spectral space advantageous for streak removal or noise removal, because the noise or streaks could be made signal independent in the <u>frequency domain</u> and thus easier to remove." (emphasis added)

This assumption is incorrect. Fiete operates in the spatial domain.

As to Claim 6, the rejection stated:

> 'With regard to claim 6, Fiete discloses a method for removing columnar streaks in a digital image, comprising steps b) through e) and g) through r), but not steps a), f), and s).
>
> 'b) selecting first and second adjacent columns of pixels from the transformed digital image (Fig. 4A, element 30);
>
> 'c) forming a column of pixel value pairs, representing the pixel values of the adjacent pixels in the two columns (Fig. 4A, element 32);
>
> 'd) forming columns of local mean values, representing the mean values of pixels in an N-pixel window for each column (Fig. 4A, element 34);
>
> 'e) forming columns of mean-reduced values, representing the pixel value minus the corresponding local mean values in each column (Fig. 4A, elements 36 and 38);
>
> 'g) forming a column of difference metric values, representing the sum of the squares of the difference between corresponding mean reduced values in an N pixel window (Fig. 4A, element 38);

'h) forming a first reduced column of pixel value pairs by removing from the column of pixel value pairs, those pixel values whole absolute difference between the pairs is greater than a predetermined difference threshold (Fig. 4A, element 38);

'i) forming a second reduced column of pixel value pairs by removing from the first reduced column of pixel value pairs, those pixel values whose corresponding difference metric values are greater than a predetermined difference metric threshold (Fig. 4A, element 38);

'j) forming first slope, offset, and standard error values by performing a linear regression between the pair of pixel values in the second reduced column of pixel value pairs (Fig. 4A, element 40);

'k) forming a column of linear prediction values using the slope and offset values and the first pixel value of the pair of pixel values in the second reduced column of pixel value pairs (Fig. 4A, element 42);

'l) forming a column of regression error values, representing the difference between the second pixel value of the pair of pixel values in the second reduced column of pixel value pairs (Fig. 4B, element 44);

'm) forming a third reduced column of pixel value pairs by removing from the first reduced column of pixel value pairs, those pixel values whose corresponding regression error values are greater than a predetermined regression error threshold related to the standard error value (Fig. 4B, element 48);

'n) forming second slope and offset values by performing a linear regression between the pair of pixel values in the third reduced column of pixel value pairs (Fig. 4B), element 50);

'o) setting the second slope value equal to unity if it is determined to not be statistically different from unity (Fig. 4B, element 52);

'p) setting the second offset value equal to zero if it is determined to not be statistically different from zero (Fig. 4B, element 56);

'q) adjusting the value of each pixel in the second column of pixels in the digital image by multiplying each value by the second

slope value and then substracting the second offset value (Fig 4B, element 58);

'r) repeating steps a-o for all adjacent columns of pixel values in the image (column 2, lines 37-40);

'Fiete does not disclose steps a), f), and s).

'Wober discloses steps a), f), and s).

'Wober discloses step a) transforming the multi-band image to a spectral space advantageous for noise removal for multi-band imagery, thereby forming a transformed image (column 2, lines 37-41). See discussion for claim 5a.

'Wober also discloses step f calculating the correlation between bands in the local region. The filtering for each band depends on the other spectral bands or range of frequencies because of the way the DCT (discrete cosine transform) coefficients are determined. Each coefficient corresponds to a certain frequency range and is calculated using other coefficients for other frequency bands. Therefore a correlation is calculated between bands by using the DCT coefficients. This method is referred to as "downsampling" (refer to column 11, lines 12-41). Wober uses the method of downsampling" to calculate noise variation according to the different bands. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to calculate the correlation between bands in the local region in order to calculate the noise associated with different bands.

'Wober also discloses step s) transforming the streak removed transformed image from the advantageous spectral space back to the original display space (see abstract). See discussion for claim 5i.'

Claim 6 has been amended to state:

6. A method for removing columnar streaks in a multi-band digital image, comprising the steps of:

a) transforming the multi-band data from an original spectral space of the electromagnetic spectrum to a spectrally advantageous space of the electromagnetic spectrum, thereby forming a transformed digital image;

b) selecting first and second adjacent columns of pixels from the transformed digital image;

c) forming a column of pixel value pairs, representing the pixel values of the adjacent pixels in the two columns;

d) forming columns of local mean values, representing the mean values of pixels in an N-pixel window for each column;

e) forming columns of mean-reduced values, representing the pixel value minus the corresponding local mean values in each column;

f) calculating the correlation between the bands in the local region;

g) forming a column of difference metric values, representing the sum of the squares of the difference between corresponding mean reduced values in an N-pixel window;

h) forming a first reduced column of pixel value pairs by removing from the column of pixel value pairs, those pixel values whose absolute difference between the pairs is greater than a predetermined difference threshold;

i) forming a second reduced column of pixel value pairs by removing from the first reduced column of pixel value pairs, those pixel values whose corresponding difference metric values are greater than a predetermined difference metric threshold;

j) forming first slope, offset, and standard error values by performing a linear regression between the pair of pixel values in the second reduced column of pixel value pairs;

k) forming a column of linear prediction values using the slope and offset values and the first pixel value of the pair of pixel values in the second reduced column of pixel value pairs;

l) forming a column of regression error values, representing the difference between the second pixel value of the pair of pixel values in the second reduced column of pixel value pairs and the corresponding linear regression prediction value;

m) forming a third reduced column of pixel value pairs by removing from the first reduced column of pixel value pairs, those pixel values whose corresponding regression error values are greater than a

predetermined regression error threshold related to the standard error value;

n) forming second slope and offset values by performing a linear regression between the pair of pixel values in the third reduced column of pixel value pairs;

o) setting the second slope value equal to unity if it is determined to not be statistically different from unity;

p) setting the second offset value equal to zero if it is determined to not be statistically different from zero;

q) adjusting the value of each pixel in the second column of pixels in the digital image by multiplying each value by the second slope value and then subtracting the second offset value;

r) repeating steps a-o for all adjacent columns of pixel values in the image; and

s) transforming the multi-band data back to the original spectral space.

Claim 6 is supported and allowable on substantially the grounds discussed above in relation to the other independent claims. This rejection argues that it is obvious to mix together steps of a method in the frequency domain into the middle of a streak removal method in the spatial domain. This confuses the differences between Wober and Fiete. In Wober:

> 'Note that here "frequency" means "DCT frequency".' (Wober, col. 14, line 35)

Fiete remains in the spatial domain. A local region in the frequency domain is different than a local region in the spatial domain. Is the rejection arguing that one of skill in the art would argue that operations in the one domain are interchangeable with those in the other? This is not taught by the cited references.

Claims 4-6 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3 of U.S. Patent 5, 881,182 in view of U.S. Patent No. 5,729,631 to Wober. The rejection stated:

'Although the conflicting claims are not identical, they are not patentably distinct from each other because the differences between the claims of the instant application and those of the patent are only minor.

'With regard to claim 4, patent claim 1 recites a method of removing columnar streaks from a multi-band digital image of the type in which it is assumed that pixels in a predetermined spatial and spectral region near a given pixel are strongly related to each other and employing gain and offset values to compute streak removal information comprising; testing for a strong relation between the pixels in a predetermined spatial and spectral region naear a given pixel and computing streak removal information only if such a strong relationship exists, whereby image content that does not extend the full length of the image in the column direction will not be interpreted as a streak (See Abstract).

'The patent does not disclose the improvement comprising: transforming the pixels of the multi-band image to a spectral space advantageous for streak removal, wherein the transformation is a linear combination of at least two of the original bands. Wober discloses this improvement (column 2, lines 37-44). Refer to discussion of claim 4 in the 103 rejection above.

'With regard to claim 5, claim 2 of the patent recites the steps b) through h), but does not recite steps a) and i). Wober discloses the steps a) and i). Refer to discussion of claim 5 in the 103 rejection above.

'With regard to claim 6, claim 3 of the patent recites the steps b) through e) and g) through r), but not steps a), f), and s). Wober discloses steps a), f), and s). Refer to discussion of claim 6 in the 103 rejection above.'

Claims 4-6 are allowable over the rejection on the grounds discussed above in relation to the other rejections.

Added claims 8-9 and 10-11 are supported by Claims 5 and 6, respectively, and are allowable on the same grounds.

It is believed that these changes now make the claims clear and definite and, if there are any problems with these changes, Applicants' attorney

would appreciate a telephone call.

In view of the foregoing, it is believed none of the references, taken singly or in combination, disclose the claimed invention. Accordingly, this application is believed to be in condition for allowance, the notice of which is respectfully requested.

Respectfully submitted,

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